**A Tale of Two Shuttles: NASA Lessons in Team Performance**

I served 33 years at NASA, as the Chief Knowledge Officer and Director of NASA Academy. My total focus was on developing capable people, and high performing project teams in order to increase the likelihood of mission success. At NASA I was known for saying that “performance happens at the team level”. To illustrate my point let me share what I call, “a tale of two shuttles.”

On February 1, 2003, the Space Shuttle Columbia (STS-107) disintegrated upon reentering the Earth’s atmosphere, killing all seven crew members.

The ensuing Columbia Accident Investigation Board indicated that in addition to the technical causes of the failure, there were underlying organization factors that contributed to the failure. The report identified the need for a culture committed to organization learning, where communication, collaboration, and openness of ideas would be the norm. Subsequent studies painfully pointed out the need for a culture of more effective communication and knowledge sharing.

Six years later, the Acting NASA Administrator, Chris Scolese, asked me to attend the Flight Readiness Review for Space Shuttle 119. I was asked to be in the decision room to watch for signs of how effectively we were working and collaborating as a team.

Very early in the morning a problem was the focus of discussion. On the previous Shuttle flight, it was detected that there was an unexpected hydrogen flow increase from one of the Shuttle’s main engines. The flow valve did not operate as predicted. The cause of the flow valve problem was not understood by engineering and there was not clear agreement on the potential impact.

During the next fourteen hours of review, I watched what would become one of my proudest moments working at NASA. The broad community of NASA, industry, and team partners, would be engaged in active conversation, open sharing of ideas, transparent decision-making, and intensive participation. I considered it one of the most impressive examples of collaborative teamwork that I had witnessed by a vast team under performance pressure.

The eventual decision to launch would involve a team of over 1000 people across the country communicating, collaborating, arguing, and innovating to achieve a solution. Only when safety said, “go,” would launch be considered. The engineering team would eventually design and patent a new non-invasive inspection technique.

For me, I was watching an exceptional collaboration that leveraged data, information, technology, and social capability.

Later that night, as I was driving to my hotel, it was hard to believe that these two events - one catastrophic, one successful - occurred in the same organization, almost exactly six years apart.

And yet both involved the same organization, program, most of the same people, teams, technology, processes, and of course the same industry.

So what can explain the extreme **performance variability** that I saw? and more importantly, how can we create conditions to better ensure outcomes of agility, coordination and high performance?

For me, **this is one of the critical questions of organizational life**, and it continues to intrigue me to this day. It is for this reason that I was so excited to join Columbia School of Professional Studies as Academic Director for the MS in Information and Knowledge Strategy. Along with technology, analysis, and data, high performance happens at the team level due to people who know how to collaborate and work together.

Let’s look at what became the NASA model for high performance teams.

**The most important factor in high-performance teams is people**. I can’t express this enough. Most organizations verbalize and recognize the importance of people, but there is lack of clarity as to what this means.

Let’s look at what became the NASA model for high performance teams.

**First,** team performance is high when people are focused on the future of their work. This includes sharing knowledge, cultivating a **culture where learning** and honesty is the norm. In the ‘tales of two shuttles’ a significant difference occurred in how each team handled learning. In our successful case there was open exchange, communication, argument, dissenting opinions, and a commitment to learning through conversation. This is the “sound of success.” An energy of engaged and interactive people. In the tragic Columbia disaster, there limited open exchange and learning.

**A second dimension** is focused on people, but in relation to current events. Our most successful teams nurture an environment of **respect and inclusion.** All members feel that they are heard and have something to contribute. This doesn’t happen by accident. During the 2009 Shuttle review, a member of the team raised a point that clearly had nothing to do with the specific issue. It was a question about a separate discipline issue. The Shuttle Program Director, Bill Gerstenmaier calmly asked whether the question had anything to do with this problem. The engineer said, “no, but she wanted to raise this as a future concern.” Bill calmly asked if we could table this issue and stay focused on the current challenge. The engineer agreed and the meeting proceeded. This indicated a leader who respected and was inclusive of all ideas. It encouraged participation for all topics, and promoted a team of open exchange without fear.

Most work today is conducted across global teams. This raises the importance of building teams that respect and are inclusive of all its members.

Let me shift to the other side of the team model.

Effective teams also stay focused on the mission. The work that needs to be accomplished.

**A third critical dimension** of high performing teams is that they embrace and have clarity about the importance of their work and the vision for success. Our most successful projects leveraged ideas, innovation, possibility, as a way to keep a team charging toward the future. **Clarity about the vision, goals provides a fuel for seeking out ideas for improvement**.

During the failed Columbia mission, one of the most important characteristics was turning down ideas and different viewpoints. A safety engineer’s ideas were shouted down as being irrelevant. NASA leadership did not request photos of the Shuttle from another government agency since they were not deemed necessary. Those photos may have provided valuable information about the damage to the vehicle.

During the successful Shuttle mission, over 1000 people were engaged in intensive activities seeking solutions and answers. A new inspection technique would be patented during investigation. This innovation was developed in a team culture that committed to no launch until answers had been identified. The purpose of the mission contributed to the need for ideas, innovations, and blue-sky thinking.

**The fourth dimension** represents a focus on the work that needs to be accomplished and establishing management processes for operational effectiveness. This is the dimension of **management, process, standards, roles, and governance that contributes to best practice**. This needs to be tailored to the context, but it provides a framework for how we are successful in our organization. NASA employed standards for management of complex programs and projects based on decades of expertise and knowledge. Methods were used because they contributed to safety and success.

**Performance happens at the team level**, and we know what contributes to successful teamwork. However, it requires hard work, resources, and perseverance.

Successful leaders are **focused on people and mission**. They approached these dimensions in the present time, and with an eye on the future. Successful leaders take the time to build and maintain teams through discussion of team dimensions, assessment of performance, coaching, and tools that promote the health of a team.

In my NASA experience it is the greatest risk factor, and the only **competitive advantage** for an organization.